

Instructional Plan/Learning Activities

Content: Mathematics

Math:

- Students will understand that solid geometric relationships, patterns, and functions can be used to develop mathematical arguments with respect to the characteristics and properties of two- and three-dimensional art.
- Students will understand that visualization, spatial reasoning, and geometric modeling can be used to solve problems in multiple fields, including mathematics and art.

Math:

- How can math be applied to create and interpret art?
- How can technology be used to explore, expand, and interpret mathematics in terms of art?

MLR - Geometric Figures - 1.

- Students represent solid figures in two dimensions.
- **Lessons:**
 1. Points, Lines, and Planes in Space
 2. Prisms and Cylinders
 3. Pyramids, Cones, and Spheres
 4. Viewing and Making Solids and Surfaces
 5. Plane Sections and Reflection Symmetry in Space
 6. Applications of Solid Geometry

Students will know... **Formative Assessment**

1. **Students will know** the important properties and relationships between basic two- and three-dimensional figures.

Students will be able **Product Summative Assessment**

1. Explain:
- Explain characteristics and properties of two- and three-dimensional geometric shapes and develop mathematical

		arguments about geometric relationships.	
2. Students will know properties of solids and surfaces of three-dimensional figures such as prisms and cylinders.	Quizzes Discussion Observation	2. Interpret: • Illustrate the properties of solids and surfaces of three-dimensional figures.	Sketch & Glogster
3. Students will know properties of three-dimensional figures such as pyramids, cones, and spheres.	Quizzes Discussion Observation	3. Apply: • Build three-dimensional figures.	Sketch & Glogster
4. Students will know that there are multiple views in three-dimensions that can be represented in two-dimensions.	Observation Work Sample	4. Empathy: • Imagine three-dimensions on a two-dimensional plane.	Nets, Tumblr, & Bubbl
5. Students will know that a three-dimensional figure can be intersected a two-dimensional plane.	Observation Work Sample	5. Perspective: • Analyze the effect of an intersection of a two-dimensional plane on a three-dimensional figure.	Google Sketchup
6. Students will know the applications of solid geometry.	Self-Assessment Dialogues	6. Self Knowledge: • Realize how solid geometry applies in the real world, including the field of art.	Calameo Publication
Instructional Plan	Understanding Knowledge Skills	MLR - Math	Conceptual Lens MLR - Art

1. Hook:	Students will understand	MLR - Mathematics - Geometric Figures - 1.	MLR - Art - A. Disciplinary Literacy:
	how math can be applied to create and interpret art.	Students represent solid figures in two dimensions.	Visual Arts - A2. Elements of Art & Principles of Design.
<ul style="list-style-type: none"> • Class discussion comparing and contrasting the artwork of Alexander Calder and Wassily Kandinsky. 	Students will know the important properties and relationships between basic two- and three-dimensional figures.	MLR - Geometric Measurement - 3. Students will understand how to use proportional relationships to make	Students show literacy in the art discipline by understanding and demonstrating concepts, skills, terminology, & processes. Students compare features of composition both within
Calder's "The Hostess"	Students will be able to explain characteristics and properties of two- and three-dimensional	indirect linear measurements and use scale drawings to make their linear	an art work and among art works.
Kandinsky's "Point and Line to Plane"	geometric shapes and develop mathematical arguments about geometric relationships.	measurements.	
Learning Activity (Graphic Organizer, Cooperative Learning, Technology):			MLR - Art - B. Creation, Performance, and Expression - Visual Arts - B2. Composition Skills. Students create, express, and
<ul style="list-style-type: none"> • Graphic Organizer: See Unit Graphic Organizers 			communicate through the art discipline. Students use Elements of Art and Principles of Design to
<ul style="list-style-type: none"> • Cooperative Learning: Think-Pair-Share 			create original art works that demonstrate different styles in paintings, 3D objects, drawings from
<ul style="list-style-type: none"> <ul style="list-style-type: none"> ◦ Think: Think over prompts about the transformation between 2D & 3D and find examples. 			imagination and real life, and a variety of other media and visual art forms.
<ul style="list-style-type: none"> <ul style="list-style-type: none"> ◦ Pair: Discuss as a group and begin building a 3D Kandinsky. If necessary, add words to show mathematical 			MLR - Art - B. Creation, Performance, and Expression - Visual Arts - B4. Exhibition. Students select and
			prepare art works for display in the classroom, school, or other community location, and articulate an artistic justification for

concepts.

- Share: Share sculpture with the class and justify the relationship between art, math, and dimensions.

- Technology: Blogger, Internet research, & digital camera.

Artifact:

- Sculpture & Blog: Students will create a contour line self-portrait from one piece of wire, take a picture, upload it to Blogger, and compare their sculpture to this lesson's artwork.

2.

Hook:

- In groups, students will discuss the similarities and differences between the shapes of the objects in their discovery bag.

Learning Activity (Graphic Organizer, Cooperative Learning, Technology):

* Graphic Organizer: See Unit Graphic Organizers

Students will understand

how math can be applied to create and interpret art.

Students will know

properties of solids and surfaces of three-dimensional figures such as prisms and cylinders.

Students will be able to

illustrate the properties of solids and surfaces of three-dimensional figures.

MLR - Mathematics - Geometric Figures - 1.

Students represent solid figures in two dimensions.

MLR - Geometric Measurement - 3.

Students will understand how to use proportional relationships to make indirect linear measurements and use scale drawings to make their linear measurements.

their selection.

MLR - Art - B. Creation, Performance, and Expression - Visual Arts - E2. The Arts & Other Disciplines.

Students explain skills and concepts that are similar across disciplines.

MLR - Art - A. Disciplinary Literacy: Visual Arts - A2.

Elements of Art & Principles of Design. Students show literacy in the art discipline by understanding and demonstrating concepts, skills, terminology, & processes. Students compare features of composition both within an art work and among art works.

MLR - Art - B. Creation, Performance, and Expression - Visual

- Cooperative Learning:
Think-Pair-Share
 - Think: Students are grouped by different/same colored blocks to think and discuss their discovery bags.
 - Share: Share mathematical properties.
- Technology:
Camera, Skitch & Glogster

Artifact: [Skitch](#) & [Glogster](#)

Arts - B2. Composition Skills. Students create, express, and communicate through the art discipline. Students use Elements of Art and Principles of Design to create original art works that demonstrate different styles in paintings, 3D objects, drawings from imagination and real life, and a variety of other media and visual art forms.

MLR - Art - B. Creation, Performance, and Expression - Visual Arts - B4. Exhibition. Students select and prepare art works for display in the classroom, school, or other community location, and articulate an artistic justification for their selection.

MLR - Art - B. Creation, Performance, and Expression - Visual Arts - E2. The Arts & Other Disciplines. Students explain skills and concepts that are similar across disciplines.

3. Hook:	Students will understand how math can be applied to create and interpret art.	MLR - Mathematics - Geometric Figures - 1. Students represent solid figures in two dimensions.	MLR - Art - A. Disciplinary Literacy: Visual Arts - A2. Elements of Art & Principles of Design. Students show literacy in the art discipline by
<ul style="list-style-type: none"> • Watch Out of Egypt: Pyramids as a Pathway. 	Students will know properties of	MLR - Geometric	

**Learning Activity
(Graphic Organizer,
Cooperative Learning,
Technology):**

- Graphic Organizer: See Unit Graphic Organizers
- Cooperative Learning: Think-Pair-Share
 - Think: Think over hook.
 - Pair: Discuss pyramids & cones.
 - Share: Graffiti Wall discussion.
- Technology: Skitch, Glogster, & digital camera.

Artifact: [Skitch](#) & [Glogster](#)

three-dimensional figures such as pyramids and cones.

Students will be able to build three-dimensional figures.

Measurement - 3.

Students will understand how to use proportional relationships to make indirect linear measurements and use scale drawings to make their linear measurements.

understanding and demonstrating concepts, skills, terminology, & processes. Students compare features of composition both within an art work and among art works.

MLR - Art - B. Creation, Performance, and Expression - Visual Arts - B2. Composition Skills. Students create, express, and communicate through the art discipline. Students use Elements of Art and Principles of Design to create original art works that demonstrate different styles in paintings, 3D objects, drawings from imagination and real life, and a variety of other media and visual art forms.

MLR - Art - B. Creation, Performance, and Expression - Visual Arts - B4. Exhibition. Students select and prepare art works for display in the classroom, school, or other community location, and articulate an artistic justification for their selection.

MLR - Art - B. Creation, Performance, and Expression - Visual Arts - E2. The Arts & Other Disciplines.

			Students explain skills and concepts that are similar across disciplines.
4. Hook:	Students will understand how technology can be used to explore, expand, and interpret mathematics in terms of art.	MLR - Mathematics - Geometric Figures - 1. Students represent solid figures in two dimensions.	MLR - Art - A. Disciplinary Literacy: Visual Arts - A2. Elements of Art & Principles of Design. Students show literacy in the art discipline by understanding and demonstrating concepts, skills, terminology, & processes. Students compare features of composition both within an art work and among art works.
Learning Activity (Graphic Organizer, Cooperative Learning, Technology):	Students will know that there are multiple views in three-dimensions that can be represented in two-dimensions.	MLR - Geometric Measurement - 3. Students will understand how to use proportional relationships to make indirect linear measurements and use scale drawings to make their linear measurements.	MLR - Art - B. Creation, Performance, and Expression - Visual Arts - B2. Composition Skills. Students create, express, and communicate through the art discipline. Students use Elements of Art and Principles of Design to create original art works that demonstrate different styles in paintings, 3D objects, drawings from imagination and real life, and a variety of other media and visual art forms.
<ul style="list-style-type: none"> • Building nets out of straws. 	<ul style="list-style-type: none"> • Graphic Organizer: See Unit Graphic Organizers • Cooperative Learning: <ul style="list-style-type: none"> ◦ Building nets in groups of 4. ◦ Individual Tumblr/Bubbl. • Technology: Interactive Nets, Tumblr, & Bubbl. 		
Artifact: Nets, Tumblr, & Bubbl.			MLR - Art - B. Creation, Performance, and Expression - Visual Arts - B4. Exhibition. Students select and prepare art

works for display in the classroom, school, or other community location, and articulate an artistic justification for their selection.

MLR - Art - B. Creation, Performance, and Expression - Visual Arts - E2. The Arts & Other Disciplines.

Students explain skills and concepts that are similar across disciplines.

5. Hook:

- [Google Sketchup Video](#)

Learning Activity (Graphic Organizer, Cooperative Learning, Technology):

- Graphic Organizer: See Unit Graphic Organizers
- Cooperative Learning: Pair & Share
 - Pair: Design a house!
 - Share: Share floor plans with the class.
- Technology: Google Sketchup

Artifact: Floor Plans in Google Sketchup.

Students will understand how technology can be used to explore, expand, and interpret mathematics in terms of art.

Students will know that a three-dimensional figure can be intersected a two-dimensional plane.

Students will be able to analyze the effect of an intersection of a two-dimensional plane on a three-dimensional figure.

MLR - Mathematics - Geometric Figures - 1.

Students represent solid figures in two dimensions.

MLR - Geometric Measurement - 3.

Students will understand how to use proportional relationships to make indirect linear measurements and use scale drawings to make their linear measurements.

MLR - Art - A. Disciplinary Literacy: Visual Arts - A2. Elements of Art & Principles of Design.

Students show literacy in the art discipline by understanding and demonstrating concepts, skills, terminology, & processes. Students compare features of composition both within an art work and among art works.

MLR - Art - B. Creation, Performance, and Expression - Visual Arts - B2. Composition Skills.

Students create, express, and communicate through the art discipline. Students use Elements of Art and Principles of Design to create original art works that demonstrate different styles in paintings, 3D

objects, drawings from imagination and real life, and a variety of other media and visual art forms.

**MLR - Art - B.
Creation, Performance,
and Expression - Visual
Arts - B4. Exhibition.**

Students select and prepare art works for display in the classroom, school, or other community location, and articulate an artistic justification for their selection.

**MLR - Art - B.
Creation, Performance,
and Expression - Visual
Arts - E2. The Arts &
Other Disciplines.**

Students explain skills and concepts that are similar across disciplines.

<p>6. Hook:</p> <ul style="list-style-type: none"> • Watch Modern Marvels: Engineering Disasters. <p>Learning Activity (Graphic Organizer, Cooperative Learning, Technology):</p> <ul style="list-style-type: none"> • Graphic Organizer: See Unit Graphic 	<p>Students will understand how technology can be used to explore, expand, and interpret mathematics in terms of art.</p> <p>Students will know the applications of solid geometry.</p> <p>Students will be able to realize how solid geometry applies in the real world, including the field of art.</p>	<p>MLR - Mathematics - Geometric Figures - 1. Students represent solid figures in two dimensions.</p> <p>MLR - Geometric Measurement - 3. Students will understand how to use proportional relationships to make indirect linear measurements and use scale drawings to make their linear measurements.</p>	<p>MLR - Art - A. Disciplinary Literacy: Visual Arts - A2. Elements of Art & Principles of Design. Students show literacy in the art discipline by understanding and demonstrating concepts, skills, terminology, & processes. Students compare features of composition both within an art work and among art works.</p> <p>MLR - Art - B.</p>
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Organizers

- Cooperative

Learning:

- Individual Research
- Share Information in groups.
- Pair: Create in pairs.
- Present to class.

- Technology:

Calameo

Artifact: [Calameo](#)

Publication

Creation, Performance, and Expression - Visual Arts - B2. Composition Skills. Students create, express, and communicate through the art discipline. Students use Elements of Art and Principles of Design to create original art works that demonstrate different styles in paintings, 3D objects, drawings from imagination and real life, and a variety of other media and visual art forms.

MLR - Art - B. Creation, Performance, and Expression - Visual Arts - B4. Exhibition. Students select and prepare art works for display in the classroom, school, or other community location, and articulate an artistic justification for their selection.

MLR - Art - B. Creation, Performance, and Expression - Visual Arts - E2. The Arts & Other Disciplines. Students explain skills and concepts that are similar across disciplines.